

Analytical Biochemistry

An International Journal

EDITOR: *Alvin Nason*

ADVISORY BOARD:

Gary Ackers
Norman G. Anderson
Eraldo Antonini
Gilbert Ashwell
H. A. Barker
Samuel P. Bessman
Simon Black
Robert L. Bowman
Ludwig Brand
A. E. Braunstein
Robert H. Burris
Melvin Calvin
Andreas Chrambach
Frank Eisenberg, Jr.
Jacques R. Fresco
Victor Ginsburg
I. C. Gunsalus
Harlyn O. Halvorson
Osamu Hayaishi

Edward C. Heath
Leslie Hellerman
C. H. W. Hirs
Evan C. Horning
Rollin D. Hotchkiss
Walter L. Hughes
William B. Jakoby
Nathan O. Kaplan
Ephraim Katchalski
Irving Klotz
Luis F. Leloir
Oliver H. Lowry
Feodor Lynen
Brian J. McCarthy
Donald McCormick
William D. McElroy
Vincent Massey
Alan H. Mehler
Bruce Merrifield

Marshall Nirenberg
Kazuo Okunuki
Sarah Ratner
Alexander Rich
David Rodbard
Gerhard Schmidt
Michael Sela
Esmond E. Snell
Sol Spiegelman
Paul K. Stumpf
Charles A. Thomas, Jr.
Sidney Udenfriend
Bert L. Vallee
Samuel B. Weiss
Theodor Wieland
George Wolf
W. A. Wood
Lemuel D. Wright
David A. Yphantis

VOLUME 70
1976

ACADEMIC PRESS
New York and London



A Subsidiary of Harcourt Brace Jovanovich, Publishers

Copyright © 1976 by Academic Press, Inc.

All Rights Reserved

No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the copyright owner.

CONTENTS OF VOLUME 70

NUMBER 1, JANUARY 1976

R. MITRA, J. BURTON, AND J. E. VARNER. Deuterium Oxide as a Tool for the Study of Amino Acid Metabolism	1
N. KRISHNAN AND G. KRISHNA. A Simple and Sensitive Assay for Guanylate Cyclase	18
GERHARD BAUMANN AND ANDREAS CHRAMBACH. A Highly Crosslinked, Transparent Polyacrylamide Gel with Improved Mechanical Stability for Use in Isoelectric Focusing and Isotachopheresis	32
THOMAS W. DOEBBER AND LEON L. MILLER. Circumvention of Interference by Sulfhydryl Compounds in Azo Dye Determination of β -Naphthylamine from Synthetic Protease Substrates	39
M. W. JOHNSON AND G. O. OSUJI. A New Reagent for Preparing Radioactively Labeled Nucleoside Derivatives	45
BARTON A. KAMEN, PATRICIA L. TAKACH, RADKA VATEV, AND J. DOUGLAS CASTON. A Rapid, Radiochemical-Ligand Binding Assay for Methotrexate	54
G. T. ASTERIADIS, M. A. ARMBRUSTER, AND P. T. GILHAM. Separation of Oligonucleotides, Nucleotides, and Nucleosides on Columns of Polystyrene Anion-Exchangers with Solvent Systems Containing Ethanol	64
JAMES M. BAILEY AND NORMAN DAVIDSON. Methylmercury as a Reversible Denaturing Agent for Agarose Gel Electrophoresis	75
ERIK SLINDE, KNUT-JAN ANDERSEN, LARS MØRKRID, AND HARALD KRYVI. Sedimentation Coefficient, Buoyant Density, Morphology, and Optimal Recovery of Mitochondria from the Ileal Mucosa of Guinea Pigs	86
DEBORAH BERNHARDT MOWSHOWITZ. Permeabilization of Yeast Assays: An Extremely Simple Method for Small Samples	94
D. F. SARGENT. An Apparatus for the Measurement of Very Small Membrane Relaxation Currents	100
M. A. YOUNG AND D. M. DESIDERIO. Detection of Asparagine and Glutamine in Peptides Sequenced by Dipeptidyl Aminopeptidase I via Gas Chromatography-Mass Spectrometry	110
ERIK FRIES. Visualization of Protein Zones in Preparative Electrophoresis and Carrier Ampholyte Zones on Isoelectric Focusing in Gel Slabs by Two Light Refraction Methods	124
PAUL A. HERSCH. <i>X-t</i> -Programming a Binary Gas Stream	136
R. VERBRUGGEN AND A. BAECK. Agarose Electrophoresis of Subtilisin Carlsberg in Veronal Buffer at pH 6.5	144
GEORGE H. DeVRIES, PETER MAMUNES, CHARLES D. MILLER, AND DONALD M. HAYWARD. Quantitative Determination of $C_{6:0}$ - $C_{18:3}$ Serum Nonesterified Fatty Acids by Gas-Liquid Chromatography	156
KENT K. STEWART, GARY R. BEECHER, AND P. E. HARE. Rapid Analysis of Discrete Samples: The Use of Nonsegmented, Continuous Flow	167
PETER BARTMANN, TILL HANKE, AND EGGEHARD HOLLER. Rapid Determination of an Amino Acid:tRNA Ligase-Aminoacyl Adenylate Complex on DEAE-Cellulose Filter Disks	174
C. A. ADAMS, T. C. ROBERTS, AND K. C. BUTLER. Automated Determination of Proteolytic Enzymes and of Amino Nitrogen by Use of Trinitrobenzenesulfonic Acid	181
ISRAEL POSNER. The Concentration of Macromolecules by Electrophoresis-Sedimentation	187

H. L. CAILLA, C. J. VANNIER, AND M. A. DELAAGE. Guanosine 3',5'-Cyclic Monophosphate Assay at 10^{-15} -Mole Level	195
JAY I. GOODMAN. Separation of the Products of the Reaction of Deoxyguanosine with N-Acetoxy-2-Acetylaminofluorene by High Pressure Liquid Chromatography	203
ROBERT NILSSON, ELISABETH PETERSON, AND GUSTAV DALLNER. A Simple Procedure for the Assay of Low Levels of Aryl Hydrocarbon Hydroxylase Activity by Selective Adsorption of Polyethylene	208
KINGSLEY R. LABROSSE, IRVIN E. LIENER, AND PAUL A. HARGRAVE. A Sensitive Assay for Collagenolytic Activity using Tritiated Collagen	218
LARRY M. SEITZ AND HAROLD E. MOHR. Analysis of <i>Alternaria</i> Metabolites by High-pressure Liquid Chromatography	224
ROGER L. PRIORE AND HANNAH E. ROSENTHAL. A Statistical Method for the Estimation of Binding Parameters in a Complex System	231
ANDRÉ BENSADOUN AND DAVID WEINSTEIN. Assay of Proteins in the Presence of Interfering Materials	241
PAUL G. SCOTT, ALVIN G. TELSER, AND ARTHUR VEIS. Semiquantitative Determination of Cyanogen Bromide Peptides of Collagen in SDS-Polyacrylamide Gels ..	251
MORRIS ZIMMERMAN, EDWARD YUREWICZ, AND GOOL PATEL. A New Fluorogenic Substrate for Chymotrypsin	258
DONALD DETERS, URS MÜLLER, AND HENRY HOMBERGER. Breakage of Yeast Cells: Large Scale Isolation of Yeast Mitochondria with a Continuous-Flow Disintegrator	263
R. J. ELLIOTT AND D. L. GARDNER. Proline Determination with Isatin, in the Presence of Amino Acids	268

SHORT COMMUNICATIONS

KURT MULLER AND HANS NOLL. A Rapid Procedure for the Isolation of Intact ^{32}P -labeled RNA from <i>E. Coli</i> Bacteriophage R17	274
J. H. WAITE AND C.-Y. WANG. Spectrophotometric Measurement of Dodecyl Sulfate with Basic Fuchsin	279
R. A. BOSSELMAN AND M. S. KAULENAS. A Rapid Two-dimensional Micro-electrophoretic Procedure for the Analysis of Ribosomal Proteins	281
H. A. WARD. A Simple Starting Device for Paper or Thin-Layer Chromatography in Closed Systems	285
ROBERT L. TRELSTAD AND KAREN R. LAWLEY. A Simple Economical Buffer System for Amino Acid Analysis	287
E. M. WEISS, W. F. SHIPE AND L. F. HOOD. Improved Techniques for Scoring TLC Plates	290

NUMBER 2, FEBRUARY 1976

M. CARON, A. FAURE, AND P. CORNILLOT. Affinity Electrophoresis. Role of the Interposition of Spacers between Particles and Ligands in Adsorption and Elution Processes	295
A. KUKSIS, J. J. MYHER, L. MARAI, AND K. GEHER. Estimation of Plasma Free Fatty Acids as the Trimethylsilyl (TMS) Esters	302
GERRIT VOORDOUW, CAROL MILO, AND RODNEY S. ROCHE. The Determination of the Binding Constant of Metalloenzymes for Their Active Site Metal Ion from Ligand Inhibition Data. Theoretical Analysis and Application to the Inhibition of Thermolysin by 1,10-Phenanthroline	313
BRUCE O. BARGER, FRED C. WHITE, JUDITH L. PACE, DAVID L. KEMPER, AND W. L. RAGLAND. Estimation of Molecular Weight by Polyacrylamide Gel Electrophoresis Using Heat Stable Fluorophors	327

GERALD KRYSTAL AND A. F. GRAHAM. A Sensitive Method for Estimating the Carbohydrate Content of Glycoproteins	336
MICHAEL YARUS. Adsorbent Filters: A New Technique for Microexperimentation on Nucleic Acid	346
RALPH E. SMITH AND KRISTINA QUADE. Production of Large Quantities of ³² P-Labeled RNA Tumor Virus Nucleic Acid	354
S. R. BURZYNSKI. Sequential Analysis in Subnanomolar Amounts of Peptides. Determination of the Structure of a Habituation-Induced Brain Peptide (Ameletin)	359
J. M. BOEYNAEMS. Comparison of the Effects of Chemical and Isotopic Dilution on the Dissociation of Bound Labeled Ligands	366
JOHN ABRAHAM, FIORINDO A. SIMEONE, AND ROBERT W. HOPKINS. A Sensitive Assay for Allantoin	377
N. N. REHAK, J. EVERSE, N. O. KAPLAN, AND R. L. BERGER. Determination of the Activity and Concentration of Immobilized and Soluble Enzymes by Microcalorimetry	381
JULIA ZUBROFF AND D. S. R. SARMA. A Nonradioactive Method for Measuring DNA Damage and Its Repair in Nonproliferating Tissues	387
A. J. FINLAYSON AND S. L. MACKENZIE. A Rapid Method for Methionine Determination in Plant Materials	397
RAYMOND J. JACKSON AND RICHARD G. KEIGHTLEY. A Rapid Radiometric Assay for Adenosine Deaminase	403
DONALD R. BRADY, THOMAS W. MATTINGLY, AND JAMES L. GAYLOR. A Simplified Assay of 4-Methyl Sterol Oxidase of Liver Microsomes	413
DAVID MIRELMAN. A Rapid and Simple Procedure for the Preparation of the Two Bacterial Cell Wall Peptidoglycan Nucleotide Precursors Labeled in Their Amino Sugars	424
JOSEPH BIETH, MONIQUE PICHOR, AND PIERRE METAIS. Pseudo-Zero Order Solubilization of Remazol-Brilliant-Blue Elastin by Elastase	430
ANDERS EKLUND. On the Determination of Available Lysine in Casein and Rapeseed Protein Concentrates Using 2,4,6-Trinitrobenzenesulphonic Acid (TNBS) as a Reagent for Free Epsilon Amino Group of Lysine	434
ROGENE F. HENDERSON AND MICHAEL H. CLAYTON. Cryochromatography: A Method for the Separation of Lung Phosphoglycerides According to the Number and Length of Saturated Fatty Acid Components	440
THAKOR R. PATEL AND BRUCE A. MCFADDEN. A Simple Spectrophotometric Method for Measurement of Nematode Populations	447
C. H. SISSONS. Improved Technique for Accurate and Convenient Assay of Biological Reactions Liberating ¹⁴ CO ₂	454
R. ANAND, M. G. GORE, AND G. A. KERKUT. An Automated Method for Acetylcholinesterase Kinetics	463
M. WILKINSON, G. A. IACOBUCCI, AND D. V. MYERS. 5-Methyltryptophan: An Internal Standard for Tryptophan Determination by Ion-Exchange Chromatography	470
NEELAKANTAN VAIDYANATH, RONALD BIRKHAHN, JOHN R. BORDER, RAPIER McMENAMY, GARRET OSWALD, GREGORY TRIETLEY, AND TRAN F. YUAN. A Method for Determining Amino Acid Concentrations and Specific Activities of Amino Acids and Some Other Compounds in Biological Fluids	479
MICHAEL K. WEIBEL. A Coupled Enzyme Assay for Aldose 1-Epimerase	489
S. J. TATA AND G. F. J. MOIR. Fluorescamine as a Reagent for Location of Proteins after Electrophoresis in Starch Gel or on Paper	495
J. H. CRONENBERGER AND V. A. ERDMANN. Modified Two-Dimensional Electrophoresis for Identification and Autoradiography of Ribosomal Proteins Reacted with <i>p</i> -Chloromercuribenzoate	499

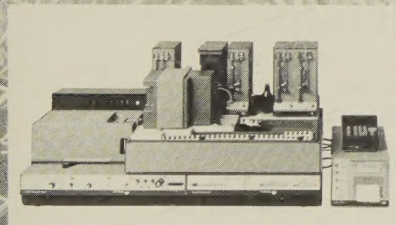
R. MOHAN, R. STEINER, AND R. KAUFMANN. Laser Doppler Spectroscopy as Applied to Electrophoresis in Protein Solutions	506
MIRO BRZIN AND SREČKO OMAN. The Magnetic Diver Differential Microgasmometer	526
KIMIE MURAYAMA, NORIKO SHINDO, AND HIKARU KOIDE. A Modification of Determination for Glucosamine and Galactosamine in Glycoprotein with the Amino Acid Analyzer. Application to Total Acid Hydrolyzate of Rat Renal Glomerular Basement Membrane	537
MICHAEL F. CALLAHAM, WILLIAM E. POE, AND JAMES R. HEITZ. Removal of Ampholines by Hollow Fiber Dialysis: Application to Dextranucrase	542
ERIKA WYSS AND WALTER WEHRLI. The Use of Dextran-Coated Charcoal for Kinetic Measurements: Interaction Between Rifampicin and DNA-Dependent RNA Polymerase of <i>Escherichia coli</i>	547
ELIZABETH K. BARBEHENN, MAGGIE M.-Y. LAW, JOSEPH G. BROWN, AND OLIVER H. LOWRY. Measurement of 5'-Adenylic Acid by Stimulation of Phosphorylase <i>a</i>	554
BERNARD R. GLICK AND DAVID J. LEGGETT. A Method for the Determination of the pK_a of α -N-Benzoyl-L-Arginine in the Presence of an Impurity	563
ALAN D. BROWNSTONE. Further Development of a Versatile System for Preparative Electrophoresis in Acrylamide Gel	572
MATTI LEISOLA AND MATTI LINKO. Determination of the Solubilizing Activity of a Cellulase Complex with Dyed Substrates	592
D. BARRITAU, A. EXPERT-BEZANÇON, M. MILET, AND D. H. HAYES. Inexpensive and Easily Built Small Scale 2D Electrophoresis Equipment	600
SHORT COMMUNICATIONS	
W. B. AMOS. An Apparatus for Microelectrophoresis in Polyacrylamide Slab-Gels	612
ERICH F. ELSTNER AND ADELHEID HEUPEL. Inhibition of Nitrite Formation from Hydroxylammoniumchloride: A Simple Assay for Superoxide Dismutase	616
RICHARD TYKVA. Exclusion of the Sample Sorption Effects on the Instability of Liquid Scintillation by Emulsion Counting	621
JORGE E. CORREDOR, DOUGLAS G. CAPONE, AND KEITH E. COOKSEY. On the Use of Liquid Scintillation Vials in ATP-Photometry	624
ROLF EKMAN, BENGT G. JOHANSSON, AND UFFE RAVNSKOV. Gel Chromatography on Sephadex Gels with Narrow Particle Size Distribution Obtained by Dry Elutriation	628
HARA P. MISRA AND IRWIN FRIDOVICH. A Convenient Calibration of the Clark Oxygen Electrode	632
BRIDGET T. HILL. The Use of Anti-Tumour Antibiotics for Simple Quantitative Assays for DNA	635
H. PUCHINGER, G. VON SENGBUSCH, AND M. SERNETT. Rapid Fluorescence Labeling of Living Cells by Fluorescamine	639
JOHN McLAUGHLIN AND EUGENE MEERONITCH. A Simple and Sensitive Modification of the Chen Procedure for Orthophosphate Determination in the Presence of Triton X-100	643
CARL P. DIETRICH AND SONIA M. C. DIETRICH. Electrophoretic Behaviour of Acidic Mucopolysaccharides in Diamine Buffers	645
AUTHOR INDEX FOR VOLUME 70	646

Increasing workload for enzymes and substrates ?

Using Vitatron's
new AKES
you can process up to

- 120 kinetic enzyme determinations per hour, e.g. CK, GOT, GPT, LDH and α HBDH, or
- 180 enzymatic substrate measurements per hour, e.g. triglycerides and glucose, total protein

The instrument fully automates the process from sample pick-up to print-out of the results in U/l or in concentration value with positive sample identification.



The moderately priced Automatic Kinetic Enzyme and Substrate analyzer AKES also offers:

- Cost saving semi-microlitre methods.
- Absolute wavelength reproducibility.
- Fast servicing due to modular set-up.
- Accurately selectable ($\pm 0.05^{\circ}\text{C}$) and controlled ($\pm 0.01^{\circ}\text{C}$) working temperatures of 25, 30, 35 and 37°C .

VITATRON

Some 20 years of experience in developing accurate equipment for routine use in the clinical laboratory.

For more information

Send this coupon to Vitatron Scientific B.V., P.O.Box 76, NL-6210 Dieren, Holland; to Vitatron GmbH, Postfach 3, D-5062 Forsbach, B.R.D.; to Vitatron SARL, 10 Av. Jean Jaures, Malakoff, France; to Vitatron Medical Inc., 45 A Street, South Boston, Mass. 02127, U.S.A.; or to your Vitatron dealer.

Please, send information about your _____ to:
Name: _____ Position: _____
Industry or institute: _____
Address: _____
Country: _____ Postal code: _____

Recently published and forthcoming volumes in...

METHODS IN ENZYMOLOGY

Editors-in-Chief:
SIDNEY P. COLOWICK
NATHAN O. KAPLAN

Volume 35 LIPIDS/Part B

Edited by JOHN M. LOWENSTEIN
*Graduate Department of Biochemistry
Brandeis University
Waltham, Massachusetts*

1975, 672 pp., \$34.50/£16.55

CONTENTS:

FATTY ACID SYNTHESIS

FATTY ACID ACTIVATION AND OXIDATION

HMG-CoA ENZYMES

HYDROLASES

MISCELLANEOUS ENZYMES

GENERAL ANALYTICAL METHODS

SYNTHESIS OR PREPARATION OF SUBSTRATES

PREPARATION OF SINGLE CELLS

IN VIVO AND PERFUSION TECHNIQUES

FOR COMPLETE TABLE OF CONTENTS
PLEASE CONTACT PROMOTION DEPT.

AP 5050

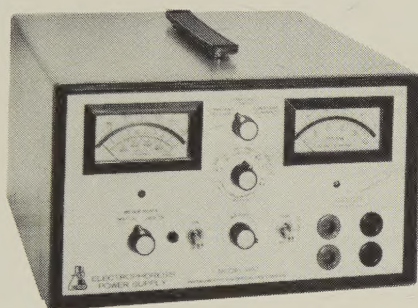
PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE



ACADEMIC PRESS

A Subsidiary of Harcourt Brace Jovanovich, Publishers
111 Fifth Avenue, New York, N.Y. 10003
24-28 Oval Road, London NW1 7DX

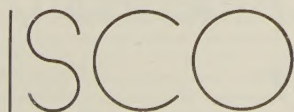
get faster separations with **CONSTANT POWER**



a new idea in electrophoresis power supplies from ISCO

If your present power supply with constant voltage or current requires constant resetting, you should consider the advantages of an ISCO Model 492 with constant power. In a system where the resistance is continually changing, only constant power can automatically provide maximum voltage and migration speed without the danger of overheating the gel or other electrophoretic medium. The Model 492 also offers constant current or voltage.

For more details on the Model 492 and other equipment for electrophoresis and liquid chromatography, send for your ISCO catalog now.



BOX 5347
LINCOLN, NEBRASKA 68505

PHONE (402) 464-0231
TELEX 48-6453

The complete aqueous cocktail

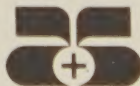
For liquid
scintillation counting



PCS™ —Phase Combining System for Liquid Scintillation Counting of Radioactive Samples.

The most versatile and effective cocktail
for aqueous and organic solutions.

For complete information, call or write:



Amersham/Searle

AMERSHAM / SEARLE CORPORATION

An Activity of G. D. Searle & Co. and the Radiochemical Centre

2636 S. Clearbrook Drive/Arlington Heights, Illinois 60005

Telephone: Toll free: 800-323-9750—Telex: 28-2452

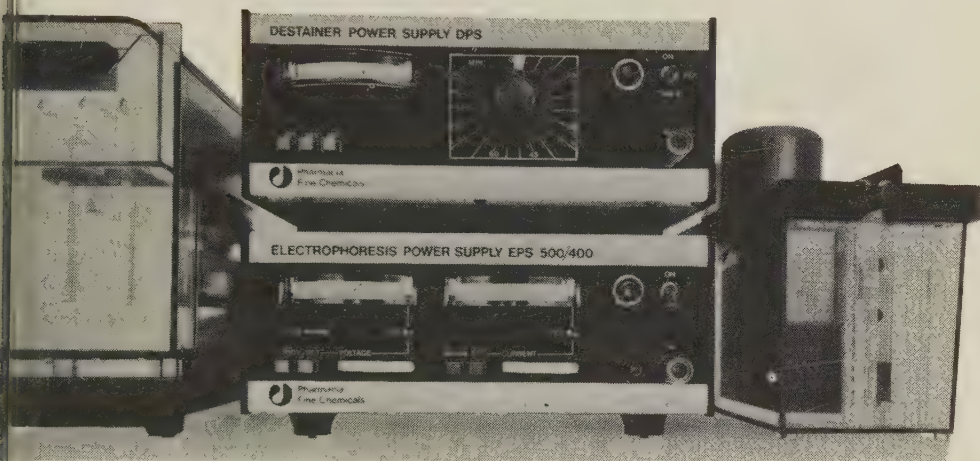
In Illinois, Alaska, Puerto Rico, & Hawaii: 312-593-6300

400 Iroquois Shore Road/Oakville, Ontario

Telephone: 416-844-8122—Telex: 069-82216

A757002

This is a new P.A.G.E.



Pharmacia Gel Electrophoresis System for polyacrylamide gradient electrophoresis and other P.A.G.E. techniques

Complete system

Capabilities for the new pore gradient electrophoresis
Gel, two dimensional studies, gel rod electro-

Polyacrylamide gradient gels PAA 4/30

Extensive ready-to-use gradient gel slabs give extreme
resolution over the whole range 50,000–2 million MW.
Staining migration concentrates the zones after separa-
tion by molecular size.

Electrophoresis apparatus GE-4

16 slabs, 12 samples on each, or 16 gel rod capacity.
Modular construction with built-in cooling system.
Range of accessories for all applications

Electrophoresis power supply EPS 500/400

Compact, all solid state. 0–400 mA constant current,
0–500 V constant voltage with automatic cross-over.
Maximum effect 60 W. Full personnel and instrument
protection.

Gel destainer GD-4

Electrophoretic or diffusion destaining of slabs or rods in a
single operation. Twin cells. Active dye removal and sol-
vent circulation. Results can be inspected at any time.

Destainer power supply DPS

Compact, reliable, all solid state. Push-button selected
constant voltages 12, 24, or 36 V. Timer controls electro-
phoretic destaining up to 90 minutes.

For more about the Pharmacia Gel Electrophoresis System from your usual supplier of Sephadex® and Sepharose®.

Pharmacia Fine Chemicals Inc.
2000 Avenue
WAY
Tel 08854
(01) 469-1222

Pharmacia (Canada) Ltd.
2044 St. Regis Boulevard
Dorval, Quebec, Canada
(514) 684-8881

 **Pharmacia
Fine Chemicals**

INTERTECHNIQUE SL-4000 LIQUID SCINTILLATION COUNTERS SET A NEW LABORATORY STANDARD



400 SAMPLE RACK-TYPE TRANSPORT for fast and fast out sample handling.
Unique reverse, cycle and automatic search features.

MULTI-USER PROGRAMMER WITH SIX CONTROL COMMAND CARDS® for independent set-up of 16 instrument parameters per user.
Makes one SL-4000 do the work of seven.

ON-LINE CHEMILUMINESCENCE SUBTRACTOR counts fresh samples immediately no waiting, no additives.

ADVANCED COMPUTATION with the 16 386 Multi-Mat-4000 computer option. Program in LEM, the bio-scientist's language. Delivered with over 50 ready-to-go LEM programs.

For more information...

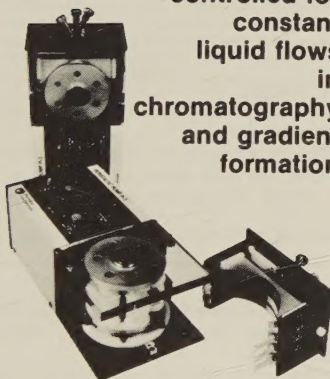
ICN
INTERTECHNIQUE

78370 PLAISIR-FRANCE - Teleph.: (1) 460.33.00
cable address INTERTEC Telex: IN 692 642 F
U.S.A. 50 Van Buren Avenue WESTWOOD,
New Jersey 07675 Tel : (201) 664-7070

NEW

Pharmacia Peristaltic Pump P-3

**A compact pump
electronically
controlled for
constant
liquid flows
in
chromatography
and gradient
formation**



You can

- obtain three different flow rates at the same time through the three individually tensioned pumping channels
- change tubes in seconds with the snap-in cassette
- forget about pulsation thanks to the large driven rollers
- rely on a constant motor speed, electronically compensated for load and temperature
- use any flow rate between 0.6 and 400 ml/h per channel with the same gear box
- reverse the flow instantly
- push for maximum flow and clear pump lines rapidly

*For free descriptive literature,
write or call:*

Pharmacia Fine Chemicals Inc.
800 Centennial Avenue
Piscataway, New Jersey 08854
Phone (201) 469-1222



**Pharmacia
Fine Chemicals**



We are pleased to announce
Another "First"

Highly Purified HUMAN THROMBIN

Essentially devoid of other known non-activated and activated clotting
factors as well as Plasminogen and Plasmin.

LYOPHILIZED GRADES

Product No.	Electrophoretic Purity	NIH U/mg Protein	Tentative Price			10 vials (premeasured) 10 NIH U each
			250 NIH Units	1000 NIH Units	5000 NIH Units	
T 6759	Essen. Homogen.	3000 (min)	£14.33	£36.73	£174.68	£11.20
T 6884	>80%	2000 (min)	£12.99	£33.59	£157.21	£ 8.96
T 7009	>50%	1000 (min)	£11.20	£30.01	£134.37	£ 6.72

Includes shipping costs via Air (CIF).

The premeasured vials are convenient for routine use in the Thrombin-Time test, platelet aggregation function, etc.
Excess rehydrated Thrombin solutions can be stored for several months below 20°C.

Protein determined per Lowry et al: JBC 193:265 (1951) and by absorbancy at 280 nm prior to lyophilization.

LIQUID GRADE

T 3010 From Human Plasma.	250 units	£ 17.92
Frozen solution with 0.05M Sodium Citrate: 0.15M Sodium Chloride, pH 6.5	1000 units	£ 40.31
Activity: 3000 (min) NIH units per mg Protein (Lowry).	2500 units	£ 98.54
Approximately 5000 NIH units per ml for quantities of 2500 units and over. Smaller package sizes contain approximately 500 NIH units per ml.	5000 units	£179.16

Suggested for research applications that require highest purity available.

Includes shipping costs via Air (CIF) within the Continental USA, excluding Alaska.

Shipped in dry ice, FOB St. Louis via Air Freight to Hawaii, Alaska and all other Countries.

We also offer:

A 7388 ANTITHROMBIN III (Factor Xa Inhibitor)
From Human Plasma. Essentially Homogeneous by electrophoresis.
Unit Definition: 1 unit is the activity present in 0.1 ml normal Human pooled plasma tested in the presence of 0.1 unit of Heparin.
Ref: Yin, E.T. et al, Heparin (Bradshaw, R.A. and S. Wessler, Eds.), Adv. in Exptl. Med. and Biol. 52:239 (1975).

10 units £ 6.72
Price and package size are tentative. Other package sizes on request.

A 7513 HUMAN ANTITHROMBIN III ANTISERUM

Produced in Rabbit, Lyophilized.

2 ml Vial £14.56

And Several BOVINE BLOOD COAGULATION FACTORS:

B2-7D	Factor II & VII Deficient Plasma	F 4253	Factor II
B7-10D	Factor VII & X Deficient Plasma	B5-3000	Factor V
B2,7,10D	Factor II, VII & X Deficient Plasma	F 4003	Factor X
BBSE	Plasma Barium Sulfate Eluate	870-10	Activated Factor X (Xa)

RBC Rabbit Brain Cephalin

V 2501 Russell's Viper Venom

RVC-L Russell's Viper Venom in Cephalin

9/75

Also, for the Determination of Plasma HEPARIN, Request Technical Bulletin No. 870

ORDER DIRECT

TELEPHONE COLLECT



from ANYWHERE in Great Britain
or Europe, 01-549-3171

— • —
Night and Holidays
N. A. Virgo 01-942-0883

— • —
Most orders will be shipped within hours
CABLE: SIGMALOND, London, England

It's a Pleasure Doing Business With Sigma!

SIGMA LONDON
CHEMICAL COMPANY LTD.

Norbiton Station Yard, Kingston-upon-Thames, Surrey, KT2 7BH, England

MANUFACTURERS OF THE FINEST BIOCHEMICALS AVAILABLE

Home office:
SIGMA Chemical Co.—P.O. Box 14508—St. Louis, Missouri, 63178 U.S.A.
Telephone: 314-771-5750 (Reverse Charges)

Also distributed through:
SIGMA Chemie GmbH MÜNCHEN • D-8014-Neubiberg, Isarstrasse 14, W. Germany
Telephone: 089/60 70 03 (Reverse Charges)

